REMARKS

Claim Rejections - 35 U.S.C. § 103

The Examiner has rejected claims 11, 14-16, 18, 21, 23, 25, 44-45, 48-49 and 51 under 35 U.S.C. § 103(a) as being unpatentable over Komino (US Patent 5,769,952) in view of Kimura et al. (US Patent 2001/0024691) and Shiba et al. (US Patent 4,669,875). The Examiner has rejected claims 20, 22 and 24 under 35 U.S.C. § 103(a) as being unpatentable over Komino and Kimura et al. as applied to claims 11, 14-16, 18, 21, 23, 25, 44-45, 48-49 and 51 above, and further in view of Matsuo et al. (JP 06-177093).

Claims 11 and 14-16

It is Applicant's understanding that the cited references fail to teach or render obvious Applicant's invention as claimed in claims 11 and 14-16. In claims 11 and 14-16, Applicant teaches and claims an apparatus for atmospheric and sub-atmospheric processing of a wafer. The apparatus includes an atmospheric transfer chamber having a wet cleaning module coupled to the atmospheric transfer chamber and also a first ashing module coupled to the atmospheric transfer chamber. The apparatus also includes a sub-atmospheric transfer chamber which includes a first sub-atmospheric processing module couple thereto, as well as a second ashing module coupled to the sub-atmospheric transfer chamber. As such, Applicant teaches and claims two ashing modules, one coupled to the sub-atmospheric transfer chamber and one coupled to the atmospheric transfer chamber. By including an

ashing or stripping module on both the sub-atmospheric and the atmospheric chamber wafer throughput can be dramatically improved.

Ashing and stripping processes typically occur at sub-atmospheric pressures. As such, it is valuable to place the stripping or ashing module on the sub-atmospheric transfer chamber because it simplifies and reduces the pumping requirements in the stripping module. Applicant has discovered, however, that there are times when it is beneficial to include a stripping module on the atmospheric chamber as well. For example, in the apparatus of the present invention, after etching a wafer in alignment with a photoresist mask, the photoresist mask can then be removed in the ashing or stripping chamber on the sub-atmospheric transfer chamber. The wafer can then be transferred into the atmospheric transfer chamber where a wet clean is applied in wet clean module 200. After the wet clean process, the wafer can then be sent into the integrated particle monitoring tool (IPM) to determine how well the wafer was cleaned. If the was not sufficiently cleaned as dictated by the IPM tool, the wafer can then be sent back into the ashing module coupled to the atmospheric process chamber. In this way, the wafer does not have to be sent back through the load lock for a subsequent ashing in chamber 400 coupled to the sub-atmospheric process chamber which could cause a bottleneck at the load locks with subsequent wafers flowing into the sub-atmospheric transfer chamber. As such, by including a second ashing chamber on the atmospheric transfer chamber, wafer throughput can be dramatically improved with Applicant's claimed apparatus.

Applicant does not understand Komino, either alone or in combination with Kimura et al., to describe an apparatus which includes two ashing or stripping modules, one coupled to a sub-atmospheric transfer chamber and one coupled to an atmospheric transfer chamber. Applicant understands Komino to describe an apparatus which includes a reduced pressure treatment unit 100 and a normal

pressure treatment unit 120 respectively communicating with a load lock 130. The reduced pressure treatment unit 100 has three reduced pressure process treatment chambers 10A, 10B and 10C (Col. 5, lines 7-23). Komino describes that the reduced pressure process treatment chamber 10A, 10B, and 10C may include, for example, two chambers for etching and the remaining chamber for an ashing treatment to remove resist (Col. 5, lines 48-59). The normal process treatment chamber 18A, 18B, 18C and 18D, may include cleaning chambers 18A and 18C, and drying chambers 18B and 18D. Komino fails to describe or suggest the use of an ashing chamber coupled to the normal pressure treatment unit. Additionally, Kimura et al. also fails to teach or describe coupling an ashing chamber to the atmospheric transfer chamber. As such, neither Komino nor Kimura et al. appreciate or suggest a single apparatus which includes an ashing chamber coupled to a sub-atmospheric transfer chamber and an ashing chamber coupled to an atmospheric transfer chamber.

The Examiner has cited Matsuo et al. as teaching a use of an ashing apparatus that is used at atmospheric pressure for the purpose of improved throughput and reduced cost. It is to be appreciated that Applicant is not claiming an ashing apparatus which is used at atmospheric pressure, but rather an ashing apparatus which is coupled to an atmospheric transfer chamber. Matsuo describes a stand alone ashing apparatus. The ashing apparatus of Matsuo is not coupled to an atmospheric transfer chamber let alone to an atmospheric transfer chamber coupled to a sub-atmospheric transfer chamber having a second ashing chamber coupled thereto. More importantly, Applicant is claiming an apparatus which includes both an ashing apparatus coupled to an atmospheric transfer chamber and a sub-atmospheric transfer chamber. None of the cited references understand or appreciate the value of providing an apparatus which includes two ashing chambers, one coupled to a sub-atmospheric transfer chamber and one coupled to

an atmospheric pressure transfer chamber. As such, the references alone or in combination fail to teach or render obvious Applicant's invention as claimed.

Claim 18, 20-21, and 24-25

It is Applicants understanding that the cited references fail to teach or render obvious Applicant's invention as claimed in claims 18, 20-21 and 24-25. Applicant teaches and claims an apparatus for etching and cleaning a wafer which includes an atmospheric transfer chamber having a first wafer handler contained therein and a sub-atmospheric transfer chamber having a second wafer handler contained therein. A single wafer wet cleaning module is coupled directly to the atmospheric transfer chamber and a first and second etch modules are coupled to the sub-atmospheric transfer chamber. Additionally, first and second ashing modules are coupled to the sub-atmospheric transfer chamber. Thus, Applicants teach and claim an apparatus which includes a sub-atmospheric transfer chamber having two ashing modules coupled thereto and two etch modules coupled thereto. By including two etch modules as well as two ashing modules on the sub-atmospheric transfer chamber, wafer flow through the apparatus is balanced for optimum use of each module. Preventing idle time of the modules contained in apparatus 100 directly increases wafer throughput and reduces cost of ownership of the apparatus.

It is Applicants understanding that Komino, either alone or in combination which Kimura et al., fails to teach or render obvious an apparatus which includes two etch modules and two ashing modules coupled to a sub-atmospheric transfer chamber. Applicant understands Komino to describe an apparatus (Figure 1) which includes a reduced pressure treatment unit 100 and a normal pressure treatment

unit 120. Komino discloses that the reduced pressure process treatment chambers may include two chambers for etching treatment and the remaining chamber for an ashing treatment to remove resist (Col. 5, lines 48-59). Applicant does not understand Komino to describe a second ashing chamber. By providing only a single ashing chamber, a bottleneck at the ashing module will be created as wafers exiting from the two etch chambers backup waiting for the single ashing chamber to remove resist. Additionally, it is to be noted that reduced pressure transfer chamber 14 of Komino does not include room for coupling additional chambers other than chamber 10A, 10B and 10C. As such, Komino clearly fails to teach Applicant's invention as claimed in claims 18, 20-21 and 24-25. As such, Applicant respectfully requests the removal of the 35 U.S.C. § 103 rejections of these claims.

Claims 44-45, 48-49 and 51

In claims 44-45, 48-49 and 51, Applicant teaches and claims an apparatus for the formation of an electrode. Applicant teaches and claims an atmospheric transfer chamber having a first wafer handler contained therein. An integrated particle monitoring tool for monitoring particles on a wafer surface is coupled to the atmospheric chamber. Additionally, an integrated thickness measurement tool is also coupled to the atmospheric transfer chamber. The apparatus includes a sub-atmospheric transfer chamber having a second wafer handler contained therein. A polysilicon deposition module is then coupled to the sub-atmospheric transfer chamber. As such, Applicant teaches and claims an apparatus which includes both a integrated thickness monitoring tool as well as a particle monitoring tool.

Applicant does not understand either Komino or Kimura et al. to teach an apparatus which includes both an integrated particle monitoring tool and an

integrated thickness measurement tool. Komino fails to describe an apparatus which includes either an integrated particle monitoring tool or an integrated thickness measurement tool. Kimura et al. describes an apparatus for forming interconnects with plated metal and removing the plated metal. The apparatus of Kimura et al. may include a dry state film thickness measurement instrument 13 disposed close to the loading and unloading section. Kimura et al. does further state that the sensor is not limited to a sensor for measuring the metal film thickness. Kimura et al specifically states that "**the sensor**" may be other various sensors for detecting substrates surface states, such as a sensor for detection of a insulating film thickness, a sensor for detection of the presence of absence of metallic thin film, a sensor for detection of presence of absence of particles on a substrate, and a sensor for recognition of patterns formed on the substrate (page 8, paragraph 88). As such, Kimura et al. specifically states that a single sensor unit is provided. As such, Kimura et al. clearly fails to teach or provide a separate integrated thickness measuring tool and a separate integrated particle monitoring tool on a single apparatus. Use of a single sensor for both measuring the thickness of a film and measuring particle formation on a wafer would greatly reduce the throughput of the apparatus taught in Kimura et al. and increase the cost of ownership. As such, Kimura et al. clearly fails to teach Applicant's invention as claimed in claims 44-45, 48-49 and 51.

Pursuant to 37 C.F.R. 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: 12/27/04

Michael A. Bernadicou
Reg. No. 35,934

Patent Counsel
Legal Affairs Dept.
APPLIED MATERIALS, INC.
P.O. Box 450A
Santa Clara, CA 95052

Telephone inquiries to:
Michael A. Bernadicou
(408) 720-8300